

**UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA**

3M Innovative Properties Co. and
3M Company,

Civil No. 13-1287 (DWF/JJK)

Plaintiffs,

v.

**MEMORANDUM
OPINION AND ORDER**

GDC, Inc., and Monadnock
Non-Wovens, LLC,

Defendants.

Ariel O. Howe, Esq., David J. F. Gross, Esq., David R. Merritt, Esq., Elizabeth Cowan Wright, Esq., James W. Poradek, Esq., and Timothy M. Sullivan, Esq., Faegre Baker Daniels LLP, counsel for Plaintiffs.

James K. Cleland, Esq., and Joshua E. Ney, Esq., Brinks Gilson & Lione; and Kurt J. Niederluecke, Esq., and Timothy M. O'Shea, Esq., Fredrikson & Byron, PA, counsel for Defendants.

INTRODUCTION

This matter is before the Court on the issue of patent claim construction pursuant to *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996).

BACKGROUND

This litigation involves allegations by Plaintiffs 3M Innovative Properties Co. and 3M Company (together, "3M") that Defendants GDC, Inc. ("GDC") and Monadnock Non-Wovens, LLC ("MNW") (together, "Defendants") are infringing one or more claims of U.S. Patent No. 5,773,375, entitled "Thermally Stable Acoustical Insulation" (the

“’375 Patent”), through the manufacture and sale of thermally stabilized insulation products. (Doc. No. 1, Compl., ¶¶ 11-15.)

The ’375 Patent relates to a “thermally stable acoustical insulation microfiber web for attenuation of sound waves.” (*Id.* ¶ 7, Ex. A (“’375 Patent”) at c. 11, ll:38-39.) The invention of the ’375 Patent is embodied in 3M’s Thinsulate™ Acoustic Insulation (“TAI”) product. (Doc. No. 79, Wright Decl. ¶ 2, Ex. 5.) TAI is a nonwoven melt-blown material made of extremely small polypropylene and polyester microfibers. (*See* ’375 Patent at c.1, ll:9-24.) In the early to mid-1990s, 3M was expanding the use of its Thinsulate™ technology to automotive and other industrial applications. (Wright Decl. ¶ 2, Ex. 6 at 3M00001118.) TAI is used in automobiles for noise reduction. (*Id.* ¶ 2, Ex. 8.)

3M’s first version of TAI was covered by U.S. Patent No. 5,298,694, entitled “Acoustical Insulating Web” (the “Thompson Patent”), which claims a method for attenuating sound waves, comprising steps including providing a non-woven acoustic insulation web with fiber diameter of less than about 15 microns, thickness of at least about 0.5 cm, density of less than about 50 kg/m³, and pressure drop of at least about 1 mm water at a flow rate of about 32 liters/min. (Wright Decl. ¶ 2, Ex. 7 (the “Thompson Patent”) at c. 19, ll:38-47.) 3M’s first version of TAI provided several advantages over existing insulation, namely higher sound absorption per weight and

easier compressibility. (Wright Decl. ¶ 2, Ex. 9 at 3M00095951-52; *id.* ¶ 2, Ex. 8.)¹ TAI includes two types of microfibers: polypropylene and polyester. (*Id.* ¶ 2, Ex. 11 at 3M00170717-18.) The polypropylene fibers dissipate sound energy into heat. (*Id.*) The polyester fibers provide durability and loft retention. (*Id.*)

3M manufactures its polypropylene melt-blown web as follows: polypropylene pellets are introduced into a hopper; the pellets are fed from the hopper to an extruder, where the pellets are subjected to pressure and heat so as to make them molten; the molten pellets are pumped toward a blown-microfiber die; and, the polypropylene melt is conveyed through the die that emits the polypropylene as extremely small microfibers that are stretched and made thinner by hot air and then collected to make a microfiber web. (Doc. No. 125, Osswald Decl. ¶ 23.)

In 3M's first version of the TAI, the polypropylene microfibers were susceptible to degradation at high temperatures and therefore could only be used in lower temperature areas of a car. ('375 Patent at c. 1, ll:11-27.) TAI was not recommended for use in areas that could become very hot, such as near the engine or surrounding the passenger cabin. 3M endeavored to solve the problem of degradation at high temperatures (or lack of thermal stability), the result being 3M's thermally stable acoustical insulation claimed in the '375 Patent.² The '375 Patent recites a thermally

¹ Existing automotive acoustical insulation products included "shoddy," which consists primarily of clumps of cotton fibers. (Wright Decl. ¶ 2, Ex. 9 at 3M00095951.)

² The inventors on 3M's '375 Patent are Michael D. Swan and Ruth A. Ebbens. ('375 Patent at [76].)

stable acoustical insulation having a thermal stabilizer or antioxidant uniformly distributed throughout the microfibers such that they are stable at 135°C for at least 10 days. ('375 Patent at 7:30-39; 7:43-8:29;11:37-12:54.) The thermal stability of the insulation allows it to be used in more locations in cars than the original TAI, namely in areas that become hot. (Wright Decl. ¶ 2, Ex. 14.)

In 2003, Defendants began selling Sonozorb®, a polypropylene melt-blown microfiber acoustical insulation that 3M alleges infringes the '375 Patent. (Wright Decl. ¶ 2, Ex. 20 at 1; *id.* ¶ 2, Exs. 21 & 22; Doc. No. 25, Answer, ¶¶ 47-52.)³ Today, Defendants advertise Sonozorb as acoustical insulation that will withstand temperatures of up to 110°C. (Wright Decl. ¶ 2, Ex. 22; Doc. No. 25 ¶ 52.)

In a Complaint filed on May 29, 2013, 3M alleges that Defendants' manufacture and sale of thermally stabilized acoustical insulation products under the brand name "Sonozorb" infringe the '375 Patent. (Compl. ¶¶ 10-15.) Defendants deny 3M's allegations and seek a declaration that the '375 Patent is invalid and/or not infringed.

DISCUSSION

I. Claim Construction Principles and the Law of Indefiniteness

A. Claim Construction

Patent claim construction, i.e., the interpretation of the patent claims that define the scope of the patent, is a matter of law for the court. *Markman v. Westview*

³ More specifically, MNW manufactures the melt-blown polypropylene microfiber web and sells it to GDC, which then cuts the microfiber web into parts such as door panels. (Answer ¶¶ 47-52; Wright Decl. ¶ 2, Ex. 21.)

Instruments, Inc., 52 F.3d 967, 970-71 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996).

Proper claim construction requires an examination of the intrinsic evidence of record, including the claim language, the specification, and the prosecution history. *Bell Atl.*

Network Servs., Inc. v. Covad Commc'ns Grp., Inc., 262 F.3d 1258, 1267 (Fed.

Cir. 2001); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

The starting point for claim construction is a review of the words of the claims

themselves. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*)

(citation omitted); *see also Vitronics*, 90 F.3d at 1582 (“First, we look to the words of the

claims themselves, both asserted and unasserted, to define the scope of the patented

invention.”). The words of a claim generally carry “the meaning that the term would

have to a person of ordinary skill in the art at the time of the invention.” *Phillips*, 415

F.3d at 1313; *see also Bell Atl.*, 262 F.3d at 1367 (“As a starting point, we give claim

terms their ordinary and accustomed meaning as understood by one of ordinary skill in

the art.”).⁴

Claims must also be read in view of the specification. *Phillips*, 415 F.3d at 1315.

The specification is always “highly relevant” to claim construction and “the single best

guide to the meaning of a disputed term.” *Id.* (citing *Vitronics*, 90 F.3d at 1582.) The

specification “necessarily informs the proper construction of the claims.” *Phillips*, 415

F.3d at 1316 (explaining that the claims must be construed so as to be consistent with the

specification) (citation omitted).

⁴ The Court refers to a “person of ordinary skill in the art” and “skilled artisan” interchangeably throughout this Order.

Generally, there is a heavy presumption in favor of the ordinary meaning of claim language, as understood by one skilled in the art. *Bell Atl.*, 262 F.3d at 1268. However, the specification may prescribe a special definition given to a claim term that differs from the meaning it would otherwise possess, or it may reveal a disavowal or disclaimer of claim scope by the inventor. *Phillips*, 415 F.3d at 1316. In such cases, the intention that is expressed by the inventor in the specification is dispositive. *Id.* The Court may not, however, import limitations from the specification into the claims. *Id.* at 1323. To avoid importing limitations from the specification into the claims, the Court considers that the purposes of the specification are to teach and enable those of skill in the art to make and use the invention and to provide a best mode for doing so. *Id.*

The Court should also consider the patent's prosecution history, which provides evidence of how the United States Patent and Trademark Office ("USPTO") and the inventor understood the patent. *Id.* The prosecution history "consists of the complete record of the proceedings before the [USPTO] and includes the prior art cited during the examination of the patent." *Id.* The prosecution history may "inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.* (citing *Vitronics*, 90 F.3d at 1582-83). The doctrine of prosecution disclaimer "preclude[s] patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution." *Omega Eng'g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003).

A court may, in its discretion, consider extrinsic evidence, though such evidence is less reliable than intrinsic evidence. *Phillips*, 415 F.3d at 1317-18. In most situations, intrinsic evidence will resolve any ambiguity in a disputed term, and when it does so, the court may not rely on extrinsic evidence. *Vitronics*, 90 F.3d at 1583.⁵

B. Indefiniteness

Defendants argue that several claim terms of the '375 Patent are invalid because they are indefinite. Because a patent is presumed valid, “[t]he party challenging the patent bears the burden of proving invalidity by clear and convincing evidence.” *Takeda Pharms. Co. v. Zydus Pharms. USA, Inc.*, 743 F.3d 1359, 1366 (Fed. Cir. 2014). The United States Supreme Court recently articulated the relevant standard applicable to the definiteness requirement. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2128-30 (2014). Under this standard, a patent’s claims, when “viewed in light of the specification and prosecution history,” must “inform those skilled in the art about the scope of the invention with *reasonable certainty*.” *Id.* (emphasis added). In *Nautilus*, the Supreme Court recognized that “absolute precision” was not attainable and that some “modicum of uncertainty . . . is the price to be paid for appropriate incentives for innovation.” *Id.* The Supreme Court nonetheless confirmed that a patent “must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them.” *Id.* (internal quotation marks omitted).

⁵ Here, as discussed below, the meaning of the disputed claim limitations can be determined with intrinsic evidence, and there is no need to rely on extrinsic evidence.

Patents are not directed to lawyers or the public generally, but they are directed to those skilled in the relevant art. *Id.* Indefiniteness is, therefore, gauged from the perspective of one of skill in the art as of the time of the patent application. *See id.* at 2130. A patent need not include “information readily understood by practitioners lest every patent be required to be written as a comprehensive tutorial and treatise for the generalist, instead of a concise statement for persons in the field.” *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 116, 119-20 (Fed. Cir. 2002).

II. Test Evidence and Motion to Exclude

A. Test Evidence

Many of Defendants’ arguments on indefiniteness relate to the testing of certain limitations in the ’375 Patent. Because the issues regarding testing permeate many of the claims, the Court addresses the testing issue first. With respect to several claims, for example, Defendants assert that certain limitations are indefinite because the ’375 Patent does not identify a particular test that should be used to establish the existence of a limitation, or that there are multiple available tests and their use would yield different results. In general, Defendants assert that the lack of specificity regarding appropriate testing methods render certain claims indefinite.

Although the Court will address certain arguments in more detail below, the Court notes from the outset that the disagreements with regard to testing are more appropriately addressed in the context of an infringement analysis. *See, e.g., ADC Telecomm., Inc. v. Switchcraft, Inc.*, 281 F. App’x 989, 992 (Fed. Cir. 2008) (“The parties’ dispute over the proper testing method is [] a factual question that the district court properly submitted to

the jury.”); *Union Carbide Chem. & Plastics Tech. Corp. v. Shell Oil Co.*, 425 F.3d 1366, 1377 (Fed. Cir. 2005) (“Because the claim language does not require a particular form of testing, this inquiry is not a claim construction question.”), *overruled on other grounds by Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348 (Fed. Cir. 2009); *Takeda*, 743 F.3d at 1366-67 (“[T]he mere possibility of different results from different measurement techniques” does not render a claim indefinite.). The disputes over testing methods do not support a finding of indefiniteness. Instead, the Court anticipates that the numerous disputes with respect to proper testing methods will be raised in the context of infringement and perhaps in a *Daubert* motion.

B. Motion to Exclude

The Court will briefly address 3M’s pending Motion to Exclude Defendants’ Untimely Expert Report on Indefiniteness Issues (Doc. No. 96), which was filed shortly before the *Markman* hearing. In its motion to exclude, 3M objects to Defendants’ use of the expert report of David Cook, Ph.D. (“Exova Testing Report”)⁶ in any manner to support its indefiniteness contentions because it was untimely.

Defendants submit that the test results in the Exova Testing Report were both properly and timely submitted. Defendants assert that 3M originally proposed that the time and temperature term (discussed below) be given its plain and ordinary meaning, but

⁶ Defendants deny that the report to which 3M objects is an “expert report,” and instead submit that 3M is objecting to test results (the “Exova Testing”) that were commissioned by Defendants’ expert Dr. Stephen Spiegelberg. For ease of reference, the Court refers to the report as the “Exova Testing Report.”

later submitted an alternative proposed claim construction, including one in which the time and temperature term encompasses two different test protocols—a “dome” test and a “tray” test.⁷ Defendants submit that they commissioned Exova, a Canadian firm, to conduct an experiment to determine whether samples subjected to the “dome” and “tray” tests perform similarly and to respond to Dr. Osswald’s opinion regarding the test protocols. Based on the results of the Exova tests, Dr. Spiegelberg opined that the tests would yield different results. (Doc. No. 123, Spiegelberg Rebuttal Decl. ¶¶ 84-87.) Defendants also argue that the Exova Testing Report is not an expert report, but rather it is simply a test commissioned by Dr. Spiegelberg to attach to his rebuttal declaration. Defendants assert that because the scheduling order permits rebuttal declarations, the Exova Testing Report was proper and timely.

On November 21, 2014, Defendants submitted the rebuttal declaration of Dr. Spiegelberg, to which the Exova Testing Report was attached. The Exova Testing Report contains the results of a series of heat aging experiments conducted by Exova on behalf of Defendants’ counsel. (Doc. No. 99, Sullivan Decl. ¶ 3, Ex. A (“Exova Testing Report”); *id.* ¶ 3, Ex. E.) The experiments were conducted on samples of melt-blown polypropylene microfiber acoustical insulation. (Exova Testing Report at 2.) At the end

⁷ In his declaration, 3M’s expert offered his opinion that a person of ordinary skill in the art would understand that the thermal stability test (for the claim language “for at least 10 days at 135° C”) did not specify the use of a forced air or convection oven or a particular air flow. (Osswald Decl. ¶ 126.) Further, 3M’s expert explained that there were two ways to minimize air flow around a sample when testing thermal stability: (1) place a sample in a tray having sides that act to prevent the direct impingement of air (the “tray” test); and (2) place a sample in a tray having sides that act to prevent the direct impingement of air and place another tray on top (the “dome” test). (*Id.* ¶¶ 127-28.)

of the experiments, Dr. Cook made several observations, including observations related to the color, dimensions, weight, and suppleness of the tested samples via visual examination. (*Id.*) 3M submits that these observations amount to an expert report and were untimely under the scheduling order and Rule 26(a)(2) of the Federal Rules of Civil Procedure and should be excluded under Rules 16(f) and 37(c)(1).

According to this schedule, all initial expert declarations as to claim construction were due by October 21, 2014. Rebuttal declarations were permitted to be filed by November 21, 2014. Specifically, the scheduling order in this matter set forth the following deadlines pertaining to claim construction/indefiniteness: (1) Defendants were to serve initial expert declarations as to indefiniteness by September 23, 2014; (2) 3M was to serve its rebuttal expert declaration as to definiteness, and the parties were to simultaneously file *Markman*/indefiniteness opening briefs, as well as any initial expert declaration(s) as to claim construction by October 21, 2014; and (3) the parties were to simultaneously file *Markman*/indefiniteness rebuttal briefs, as well as any rebuttal expert declaration(s) as to claim construction by November 21, 2014. (Doc. No. 71 at 1-2.)

Here, Defendants submitted two expert reports to support their indefiniteness arguments—Dr. Spiegelberg’s and Dr. Deborah Lickfield’s declarations. Despite not submitting any initial report by Dr. Cook, Defendants submitted the Exova Testing Report (which is signed by Dr. Cook and dated November 14, 2014) to 3M for use at the deposition of 3M’s expert Dr. Osswald and later submitted the Exova Testing Report as an attachment to Dr. Spiegelberg’s rebuttal declaration.

As a threshold matter, the Court notes that Defendants' argument that the newly commissioned test report is *not* an expert report is unpersuasive. In addition, Defendants' failure to disclose Dr. Cook as an expert on September 23, 2014, the date on which initial expert declarations on indefiniteness were due, appears to likely be a violation of that scheduling order. However, the Court need not decide whether the report should be excluded because, as the Court explained above, the Court has concluded that the question of indefiniteness will not be decided on the basis of disputed testing methods. Instead, most of the disputes over testing methods will be revisited at the infringement stage. Therefore, the Court denies the motion to exclude the Exova Testing Report as moot.

III. The '375 Patent

A. Relevant Claim Language and Prosecution History

The '375 Patent is a product patent with seventeen claims, all directed at a "thermally stable acoustical insulation microfiber web" comprising certain elements. Specifically, independent Claim 1 of the '375 Patent states:

1. A thermally stable acoustical insulation microfiber web for attenuation of sound waves comprising a melt-blown polypropylene microfiber web having an average effective fiber diameter of less than about 15 microns, a thickness of at least about 0.5 cm, a density of less than 50 kg/m³ and a pressure drop of at least about 1 mm water at a flow rate of about 32 liters/min., said polypropylene microfibers formed of polypropylene homopolymers, copolymers or blends thereof with a nonvolatile thermal stabilizer or antioxidant is uniformly distributed throughout the microfibers such that the microfibers are thermally stable for at least 10 days at 135° C.

('375 Patent at c. 11, ll:38-48.)

3M applied for the '375 Patent on May 29, 1996. When originally filed, the application included claims directed to a thermally stable acoustical insulation *product*, as well as claims directed to a *method* of forming a thermally stable acoustical insulation. (Wright Decl. ¶ 2, Ex. 15 at 3M00003711-14.) In the first Office Action, the Patent Office examiner required 3M to restrict the application to *either* the product claims *or* the method claims. (*Id.* ¶ 2, Ex. 16 at 3M00003728.) Specifically, the examiner explained:

The inventions are distinct, each from the other because of the following reasons: Inventions Group I [the product claims] and Group II [the method claims] are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process. In the instant case, the product can be made by a materially different process, such as blending a thermal stabilizer with the propylene pellets before the extrusion step.

. . .

Because these inventions are distinct . . . and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

(*Id.* (citations omitted).)

The examiner also rejected the claims as unpatentable over the acoustical insulating webs discussed in the Thompson Patent:

Thompson teaches an acoustical insulating web comprising microfibers having fiber diameter less than about 15 microns, a thickness of at least 0.5 cm, a density of less than about 50 kg/m³, and a pressure drop of at least about 1 mm water at a flow rate of about 32 liters/min. . . . The fiber-forming material may be propylene. Webs of melt-blown microfibers may also contain staple fibers such as crimped bulking fibers. The ratio of melt-blown microfibers to crimped bulking fibers is in the range of about 40:60 to 95:5. The invention may also contain microfiber microwebs. Fiber can also contain various additives including antioxidants.

(*Id.* at 3M00003730-31 (citations omitted).) The examiner further explained:

The difference between what is taught by Thompson and that presently claimed is that Thompson does not disclose the amount of antioxidants in his insulation to achieve the presently claimed thermal stability.

It would have been obvious for one of ordinary skill in the art to have modified the amount of antioxidant to achieve the thermal stability presently claimed. One of ordinary skill in the art would have been motivated to do this in order to provide an acoustic insulation web which is more or less thermally stable. Further, it has been held that the routine varying of parameters to produce expected changes are within the ability of one of ordinary skill in the art. Patentability over the prior art will occur only if the parameter variation produces an unexpected result. . . .

(*Id.* at 3M00003731.)

In response to this Office Action, 3M elected to pursue the product claims, amending claim 1 as follows:

A thermally stable acoustical insulation microfiber web for attenuation of sound waves comprising a melt-blown polypropylene microfiber web having an average effective fiber diameter of less than about 15 microns, a thickness of at least about 0.5 cm, a density of less than 50 kg/m³ and a pressure drop of at least about 1 mm water at a flow rate of about 32 liters/min., said polypropylene microfibers formed of polypropylene homopolymers, copolymers or blends thereof with a nonvolatile thermal stabilizer or antioxidant is uniformly distributed throughout the microfibers such that the [which] microfibers are thermally stable for at least 10 days at 135° C.

(*Id.* ¶ 2, Ex. 17 at 3M00003740 (emphasis in original).) 3M also explained:

Although Thompson et al. generically lists antioxidants among many other potential additive materials that can be incorporated into the vast range of fibrous webs described, Thompson et al. does not indicate the manner in which antioxidants can be incorporated. However, typically antioxidants can be either sprayed onto the surface of fibrous materials, or sometimes can be incorporated into the melt phase prior to forming the fibers.

Typical topical fiber spraying is relatively easy to accomplish but was found not be effective relative to melt flown polypropylene webs used

as acoustical insulation. However, with melt blown microfibers incorporating an antioxidant or thermal stabilizer into the melt phase of webs is problematic. The addition of an antioxidant and/or thermal stabilizer directly into the melt is not a conventional variable in order to vary performance of the melt blown formed fiber webs as suggested by the Examiner. . . . In forming melt-blown microfibers, the polymers used are conventionally exposed to extremely high temperatures, which high temperatures are often intentionally used to thermally degrade polypropylene to enable the formation of uniform melt-blown fibers. . . . With this in mind, the addition of significant levels of thermal stabilizers and/or antioxidants directly into the polypropylene melt phase prior to forming melt-blown microfibers is not a simple procedure or conventional in any sense.

Initially, most antioxidants or thermal stabilizers are sacrificial in nature and it would be expected that the high temperatures employed during the melt-blown processing of polypropylene would use up or destroy most additive antioxidants or thermal stabilizers in the melt. Furthermore, even if added, it would be expected that the antioxidants or stabilizers could substantially interfere with the controlled degradation of the polypropylene materials during melt processing prior to fiber formation.

The invention teaches that the conflicting needs of providing a uniformly distributed quantity of thermal stabilizer or antioxidant in the fibers forming the acoustical insulation coupled with the need for controllably degrading the polypropylene prior to formation of the melt-blown microfibers can be reconciled by injecting an antioxidant or thermal stabilizer as a liquid stream into a conveying tube equipped with an injection port located between the die in which the fibers are formed and the extruder in which the polypropylene is controllably melted and degraded

(*Id.* at 3M00003742-44.) 3M also explained that adding high levels of antioxidants to the melt phase “is not a conventional result effective variable in the melt blown art as suggested by the Examiner. The art as a whole, in fact, would teach away from this approach.” (*Id.* at 3M00003744.)

The examiner issued a Notice of Allowability, explaining:

Applicant’s arguments . . . are persuasive and are incorporated herein as reasons for allowance. Specifically, while Thompson [] teaches the basic structure of the claimed invention, there is no suggestion to add a

nonvolatile thermal stabilizer or antioxidant uniformly throughout the microfibers such that microfibers are thermally stable for at least 10 days at 135°C. Thompson merely lists antioxidants as an additive among many other potential additive materials that can be incorporated into the vast range of fibrous webs and does not teach a method by which the claimed thermal stability can be achieved. When all the limitations of the claims are considered as a whole, the claims are patentable over the prior art.

(*Id.* ¶ 2, Ex. 18 at 3M00003749 (emphasis added).) The '375 Patent was issued on June 30, 1998. 3M pursued a separate patent that was directed at a method of making thermally stable acoustical insulation that included the step of homogeneously blending the antioxidant into the feedstream after extrusion. (*Id.* ¶ 2, Ex. 19 at [54] & c. 12, ll:7-32.)

B. Disputed Claims

1. “pressure drop”

The parties dispute the meaning of the term “a pressure drop of at least about 1 mm water at a flow rate of about 32 liters/min.” as it appears in claims 1, 7-11, and 17 of the '375 Patent. ('375 Patent at c. 11, ll:42-44.)

This claim term relates to the amount of force per unit area required for a volume of air to pass through a given sample in a given period of time. (Osswald Decl. ¶ 40.) Pressure drop is a measured characteristic of acoustical insulation because a greater pressure drop (i.e., force required for air to pass through a sample) correlates to greater sound attenuation. (*Id.*)

Defendants submit that the term “pressure drop” is indefinite because: (1) the measured pressure drop depends upon the face velocity selected; and (2) the face velocity to be used in measuring the pressure drop is not provided. In support of this contention,

Defendants submit that the pressure drop of gas flowing through a porous medium, such as a microfiber web, is a function of the face velocity of the gas used to measure the pressure drop. (Doc. No. 83, Dalton Decl. ¶ 2, Ex. 6; Spiegelberg Decl. ¶ 27.)

Defendants further submit that to determine whether a microfiber web has “a pressure drop of at least about 1 mm water,” one must know *either* the face velocity at which such a drop is to be measured *or* both the volumetric flow and the face area (so that the face velocity can be calculated). (*Id.* ¶ 43.) Defendants assert that there is nothing in the intrinsic or extrinsic evidence that specifies the face velocity to be used. Moreover, Defendants assert that although the claim language requires a pressure drop “at a [volumetric] flow rate of about 32 liters/min.,” the face velocity cannot be derived because the face area is not specified.

3M proposes that the term should be construed according to its plain and ordinary meaning. 3M further submits that a skilled artisan would know how to calculate the face velocity, and would therefore know how to measure the pressure drop recited in the claims of the '375 Patent.

The specification of the '375 Patent provides the following with respect to measuring pressure drop:

The invention further relates to an acoustical insulation comprising thermoplastic melt-blown microfibers wherein the acoustical insulation web has . . . an air flow pressure drop of at least about 1 mm water at a flow rate of about 32 liters/min (as outlined in ASTM F 778-88).

. . . .

The pressure drop of the air passing through the major face of the web and across the web as outlined in test method ASTM F 778-88.

(’375 Patent at c. 3, ll:12-18; c. 9, ll:17-19 (emphasis added).) Based on the above language in the specification, 3M submits that the pressure drop should be measured using a test method set forth in ASTM F 778-88, the “Standard Methods for Gas Flow Resistance Testing of Filtration Media,” which describes a method of measuring pressure drop across a specimen of known geometry by forcing air across a specimen. (Osswald Decl. ¶¶ 41-42.) The Court agrees. The language of the specification expressly specifies the ASTM F 778-88 and a person of ordinary skill in the art would understand that one would look to ASTM F 778-88 to measure pressure drop.

The Court must next determine whether a person of ordinary skill in the art would understand how to conduct a measurement using ASTM F 778-88 with reasonable certainty. Defendants argue that the reference to the ASTM F 778-88 in the ’375 Patent’s specification does not resolve ambiguity with respect to face velocity because ASTM F 778-88 does not require the use of a particular face velocity and ASTM F 778-88 does not prescribe a particular face area that would make it possible to calculate the face velocity from the specified volumetric flow rate. (Spiegelberg Decl. ¶¶ 45-46.)

ASTM F 778-88 describes two methods to measure air flow resistance—Method A and Method B. (Dalton Decl. ¶ 2, Ex. 19 (“ASTM F 778-88”) § 4.4.) Method A is a “general method applicable to all filtration media and forms of media.” (*Id.* § 4.4.1.) Method B is a “limited method” used only when sheets of material to be tested “either edge leak or substantially deform when using the simple clamping approaches of Method A.” (*Id.* § 4.4.2.)

The parties dispute whether a skilled artisan would know whether to use Method A or Method B. Defendants submit that nothing in the '375 Patent or its prosecution history indicates which method is to be used. (Spiegelberg Decl. ¶ 46.) Defendants further submit that a person of ordinary skill in the art would have understood that a claimed acoustical insulation web would be prone to edge leakage and would deform using the clamping techniques of Method A, and therefore Method B would likely be required. The Court disagrees.

The Court finds that a skilled artisan would have known to use Method A. ASTM F 778-88 provides that Method A is a “general method applicable to all filtration media and forms of media” and thus operates as a default method. (Osswald Decl. ¶¶ 44-45, 61; ASTM F 778-88 § 4.4.1.) Nothing in the '375 Patent indicates that Method B should be used instead of Method A. Moreover, 3M has submitted compelling evidence that the microfiber web of the '375 Patent would not otherwise require the use of Method B because neither leakage nor substantial deformation are an issue when measuring the acoustical insulation of the '375 Patent. (Osswald Decl. ¶¶ 46-48, 61-63.) In particular, 3M submits that the '375 Patent is directed to a polypropylene web that has an extremely low density and extremely small fibers when the web is at least .5 centimeters thick, and that a skilled artisan would know that these characteristics would be light and supple and would not have edge leak or deformation when tested using the clamping method of Method A. (*Id.* ¶ 48.)

Next, the Court must determine whether a skilled artisan would have known to use a face area specified in Method A to calculate face velocity. ASTM F 778-88 states the following with respect to testing under Method A:

11.2 *Specimen Area*—Specimen size shall be dictated by the prevailing practice for the class of materials under test. Examples are 5.94 in.² (38.32 cm²) for papers and paperlike materials and 15.5 in.² (100 cm²) for blanket-like materials. In no case shall test specimen size for flat media be less than 5.94 in.² (38.32 cm²). Specimens may be rectangular or round; however, rectangular specimens with length to width ratios different by more than 2:1 are to be avoided.

(ASTM F 778-88 § 11.2. (emphasis added).) 3M’s expert submits that a skilled artisan, as of May 1996, would “readily understand that the acoustical insulation web of the ’375 Patent is a ‘blanket-like material’ and that a face area of A of 110 cm² should be used when measuring the pressure drop.” (Osswald Decl. ¶ 51.) Accordingly, 3M argues that, given the claimed volumetric flow rate of 32 liters/min. and a face area of 100 cm², a skilled artisan could easily calculate the face velocity to be 5.33 cm/sec. (*Id.* ¶ 52.) 3M further argues that once those three variables are known, a skilled artisan could measure pressure drop with reasonable certainty. (*Id.* ¶¶ 49, 53.)

Defendants disagree and submit that ASTM F 778-88 only provides examples of sample sizes suitable for use in Method A and, even if a skilled artisan were inclined to pick an example, that artisan would not have been certain whether the melt-blown polypropylene microfiber web should be classified as a “blanket-like” or “paper-like” material. (Lickfield Decl. ¶ 25.)

The Court concludes that a skilled artisan would have known that the melt-blown polypropylene microfiber web of the ’375 Patent is a “blanket-like” material. 3M has

submitted evidence that a melt-blown polypropylene microfiber web having the thickness, density, loft, and fiber size of the '375 Patent would be “light, supple, and fluffy—just like a blanket.” (Osswald Decl. ¶¶ 51, 70-74.) Further, the Court’s conclusion that the webs are blanket-like is supported by the physical examples of both TAI and Sonozorb, as well as the fact that Defendants have described their own Sonozorb product as a “blanket” or as having “a blanket-like inner padding.” (*Id.* ¶¶ 75-76, 79; Wright Decl. ¶ 2, Exs. 4 & 20.) Because a skilled artisan would have known that the polypropylene microfiber web of the '375 Patent is “blanket like” material, that skilled artisan would also have known to use the face area of 100 cm² for blanket-like materials. This would allow a skilled artisan to calculate face velocity and therefore measure pressure drop with reasonable certainty.

Based on the above, the Court concludes that Defendants have not met their burden of establishing that the term is indefinite by clear and convincing evidence.

2. “uniformly distributed”

The parties dispute the meaning of the term “uniformly distributed” as it appears in the following phrase found in claim 1 of the '375 Patent: “said polypropylene microfibers formed of polypropylene homopolymers, copolymers or blends thereof with a nonvolatile thermal stabilizer or antioxidant is uniformly distributed throughout the microfibers.” ('375 Patent at c. 11, ll:43-48 (emphasis added).)

3M asserts that no construction of this phrase is necessary and that the phrase simply requires the antioxidant to be “uniformly distributed throughout the microfibers”

and that its plain and ordinary meaning is clear when interpreted by a person of ordinary skill in the art. Defendants assert that the phrase should be construed as:

the polypropylene microfibers are formed by feeding a polypropylene homopolymer, copolymer or blend thereof into an extruder and, following extrusion, adding an antioxidant or thermal stabilizer to the molten polymer and mixing the molten polymer and antioxidant or thermal stabilizer immediately prior to the die through which the microfibers are formed.

(Doc. No. 82 at 21.) Defendants further assert that if the phrase is not so construed, it is indefinite.

a. Construction

Defendants submit that the patentees clearly defined this term in the intrinsic record and expressly distinguished their invention over the prior art by limiting the claims of the '375 Patent to acoustical insulation webs manufactured by a process of adding an antioxidant following extrusion and before the die. Defendants thus contend that the construction of this term must reflect that the antioxidant is added after extrusion.

3M disagrees with Defendants' proposed construction and asserts that it improperly limits the '375 Patent claims, which are product claims, to a specific manufacturing process. 3M argues that the claim language, specification, and prosecution history all demonstrate that the patent is directed at a product and not a process, and that there was no clear disavowal of claim scope as Defendants assert.

The Court first looks to the claim language of the '375 Patent, which clearly indicates that the claims are directed to a product (thermally stable acoustical insulation), and not a process for making the product. In addition, the claim language states: "said polypropylene microfibers *formed of* polypropylene homopolymers, copolymers or

blends thereof with a nonvolatile thermal stabilizer or antioxidant is uniformly distributed throughout the microfibers.” (’375 Patent at c. 11, ll:43-48.) The words “formed of” refer to a product (polypropylene microfibers) that is “formed of” types of polypropylene with certain characteristics.

Defendants propose to alter the language of the claims by using “formed by” to refer to a product that is “formed by” a certain process. However, Federal Circuit law provides that “[a] novel product that meets the criteria of patentability is not limited to the process by which it was made.” *Vanguard Prods. Corp. v. Parker Hannifen Corp.*, 234 F.3d 1370, 1372 (Fed. Cir. 2001). In addition, absent extraordinary circumstances, it is improper to read process limitations into product claims. *Baldwin Graphic Sys., Inc. v. Siebert. Inc.*, 512 F.3d 1338, 1344 (Fed. Cir. 2008); *AFG Indus., Inc. v. Cardinal IG Co.*, 375 F.3d 1367, 1373 (Fed. Cir. 2004). Defendants therefore must show that there was a disclaimer in either the specification or the prosecution history. Such a disclaimer must be clear and unambiguous. *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1377 (Fed. Cir. 2009); *see also Thorner v. Sony Computer Entmn’t Am. LLC*, 669 F.3d 1362, 1366-67 (Fed. Cir. 2012) (“The standard for disavowal of claim scope is exacting” and such a disclaimer must be clear and unambiguous.).

With respect to the ’375 Patent specification, Defendants cite to language that appears in the “Detailed Description of Preferred Embodiments”:

The novel acoustical insulation of thermally stable polypropylene melt-blown microfibers is formed by melt-blowing techniques described above where a polypropylene polymer . . . is fed into an extruder to undergo at least partial degradation Following extrusion and thermal

and/or catalytic degradation the polymer is intimately mixed with an antioxidant or thermal stabilizer immediately prior to the die.

('375 Patent, c. 8, ll:34-43; *see also* c. 9, ll:24-59 (describing process by which antioxidant is introduced after the extruder and prior to the mixing tube).) That the specification speaks of a process where the polymer is mixed with an antioxidant or thermal stabilizer after the extruder and before the mixing tube, however, does not necessarily limit the claim language to that embodiment. Indeed, it is improper to read limitations from a preferred embodiment (even if it is the only embodiment) into the claim without evidence of a clear intention to so limit a claim. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). Here, the specification describes the above method of making the claimed web. The specification, however, also speaks to a second method of making the claimed web, namely, a process by which the antioxidant would be added at the hopper:

Comparative Example Comp-1 was prepared in a similar manner to Example 15 except that the Irganox® 1010 was loaded in the hopper of the extruder as a 1 weight percent pre-blend with the polypropylene pellets instead of being injected into the resin conveying tube. The thus produced BMF web had a basis weight of 193g/m², and average EFD of 7.6 μm and analysis for the actual Irganox® 1010 level indicated a 0.21 weight percent level.

('375 Patent at c. 11, ll:28-36.) Therefore, the Court concludes that Defendants have not established that the specification demonstrates that the patentees limited the scope of the invention to a particular method or process to create the claimed thermally stable acoustical insulation.

Next, Defendants argue that during the prosecution of the '375 Patent, 3M specifically limited the claims to products manufactured in a particular manner (mixing polymer with an antioxidant or thermal stabilizer after the extruder and prior to the die). In support of this argument, Defendants submit that during the prosecution of the '375 Patent, the applicants amended claim 1 to include the phrase “with a nonvolatile thermal stabilizer or antioxidant is uniformly distributed throughout the microfibers” and expressly distinguished the prior art by emphasizing that the claimed acoustical insulation could be obtained only by adding the antioxidant following extrusion:

The invention teaches that the conflicting needs of providing a uniformly distributed quantity of thermal stabilizer or antioxidant in the fibers . . . coupled with the need for controllably degrading the polypropylene . . . can be reconciled by injecting an antioxidant or thermal stabilizer as a liquid steam [sic] into a conveying tube equipped with an injection port located between the die . . . and the extruder

(Wright Decl. ¶ 2, Ex. 17 at 3M00003744.)

There are several problems with Defendants' prosecution disclaimer argument. First, the statement relied upon, as quoted above, was made in response to the Examiner's 35 U.S.C. § 112 objections—not the obviousness rejection over the Thompson Patent. 3M specifically explained to the PTO: “The claims have been amended to specifically address the 35 U.S.C. 112 objections relating to the necessity of reciting the presence of a thermal stabilizer or antioxidant.” (*Id.* at 3M00003741.) Second, the PTO prohibited 3M from pursuing the process claim after 3M elected to pursue the product claim. Specifically, the examiner issued a restriction requirement, requiring the applicant to claim either a product or a process, but not both. 3M chose to pursue the product claims,

and cancelled the process claims.⁸ Third, Defendants’ proposed limitation (limiting the claims to a particular process) is not related to the “uniformly distributed” term.

Defendants assert that the ’375 Patent’s novelty over the Thompson Patent was adding the antioxidant to the molten polymer and mixing it immediately before the die.

However, this assertion is belied by the intrinsic evidence. The Thompson Patent did not teach a thermally stable web, and the references to antioxidants in the Thompson Patent do not rise to the level of teaching that adding antioxidants will result in a thermally stable web. Moreover, when rejecting the initially proposed claims, the PTO did not discuss the manner and timing of adding the antioxidant.

Finally, the language relied on by Defendants does not constitute a clear disavowal of claim scope. Instead, 3M stated that the “needs of providing a uniformly distributed quantity of thermal stabilizer or antioxidant in the fibers forming the acoustical insulation coupled with the need for controllably degrading the polypropylene prior to formation of the melt-blown microfibers *can be* reconciled” by adding the antioxidant after extrusion. (*Id.* at 3M00003744 (emphasis added).) This language indicates that a problem “can be” solved in a certain manner, but it does not constitute a clear and unmistakable disavowal of other methods. *In re Cederblad*, 4 Fed. App’x 914, 917 (Fed. Cir. 2001) (“The term ‘may’ does not exclude other types of processes.”); *see also Cordis Corp. v. Boston Scientific Corp.*, 561 F.3d 1319, 1329 (Fed. Cir. 2009) (explaining that “unclear

⁸ 3M pursued the process claims in a separate patent. *See* U.S. Patent No. 5,961,904, “Method of Making a Thermally Stable Acoustical Insulation Microfiber Web.”

prosecution history cannot be used to limit claims”). In addition, the ’375 Patent itself describes a second process by which the antioxidant would be added at the hopper. Further, that 3M did not limit its invention to “microfiber webs in which the antioxidant is added and mixed immediately prior to the die” is confirmed by the examiner’s statements during prosecution. In particular, the examiner recognized that the product claims of the ’375 Patent are not limited to a particular process, and confirmed that the “product can be made by a materially different process, such as blending a thermal stabilizer with the propylene pellets before the extrusion step.” (Wright Decl. ¶ 2, Ex. 16 at 3M00003728.)

The Court concludes that there was no clear and unmistakable disclaimer during the ’375 Patent’s prosecution. Nor does the claim language or specification support a disclaimer. Therefore, the claim language is not limited to products made by a particular process where the antioxidant is added after extrusion and immediately prior to the die. Instead, the Court concludes that “uniformly distributed throughout the microfibers” requires no further construction.

b. Indefiniteness

Defendants contend that if this term is so construed, it is indefinite. Specifically, Defendants argue that the intrinsic evidence does not provide sufficient information or criteria for determining whether the thermal stabilizer or antioxidant is “uniformly distributed” throughout the microfibers. 3M asserts that a skilled artisan would understand the “uniformly distributed” term to refer to adequately mixing the antioxidant with the polymer during the manufacturing process, in contrast to spraying the

antioxidant after the web was manufactured or using antioxidants that preferentially migrated to the surface of the microfibers. (Osswald Decl. ¶¶ 84-87, 93-95.)

The Court agrees that a skilled artisan would know that the term “uniformly distributed” would simply mean that the antioxidant and polypropylene are adequately mixed before melt-blowing such that the antioxidant is uniformly incorporated into the polypropylene. (*Id.* ¶ 86.) This meaning is underscored by the specification: “The combined polypropylene/antioxidant stream was split and recombined several times by the Kenix® type mixer to uniformly incorporate the antioxidant into the polypropylene before it exited the resin conveying tube.” (’375 Patent at c. 9, ll:56-59 (emphasis added); *see also, e.g., U.S. Gypsum Co. v. Lafarge N. Am., Inc.*, Civ. No. 03-6027, 2009 WL 3720032, at *11 (N.D. Ill. Nov. 2, 2009) (explaining that “uniform distribution” is a well-known concept in the art of gypsum product manufacture and finding a term requiring “uniform distribution” is not indefinite).

The ’375 Patent describes two embodiments whereby one can achieve mixing so that the antioxidant is “uniformly distributed throughout the microfibers”: (1) the antioxidant can be added at the hopper and uniformly mixed in the extruder; or (2) the antioxidant can be added at the end of the extruder and before the die and mixing it using a static mixer. In addition, 3M has submitted evidence that a skilled artisan would understand that a polypropylene melt-blown microfiber web would not be thermally stable as required by the claim language if the antioxidant was sprayed on or if it preferentially migrated to the surface of fibers instead of being uniformly distributed. (Osswald Decl. ¶¶ 86-88.)

Defendants argue that a “plain and ordinary meaning” construction does not inform one skilled in the art of the scope of the invention with reasonable certainty, in large part because the ’375 Patent does not require a particular test to evaluate whether there has been uniform distribution of the antioxidant. Specifically, Defendants argue that in order for a skilled artisan to determine whether a material is uniformly distributed throughout the microfibers, that artisan would need additional information, such as what was being tested, what test to use, and certain objective pass/fail criteria. Defendants also submit that different available tests to measure distribution could yield different results. (Spiegelberg Decl. ¶ 57; Lickfield Decl. ¶ 34.)

Defendants seem to suggest that to be definite, a patent claim must require the use of a specific test. Defendants list numerous tests that it could use and submits that these could yield different results. Defendants’ evidence in this regard, however, does not demonstrate that a person of ordinary skill would deem any of the listed tests as appropriate or even whether a particular test was available at the time of the invention. Moreover, “the Federal Circuit has made clear that a patent is not indefinite merely because it fails to specify which method of measurement should be used, or because different methods may produce different results.” *Purdue Pharm. Prods., L.P. v. Actavis Elizabeth, LLC*, Civ. No. 12-5311, 2014 WL 2624687, at *5 (D.N.J. June 11, 2014) (citation omitted); *see also Takeda*, 743 F.3d at 1366-67 (“[T]he mere possibility of different results from different measurement techniques” does not render a claim indefinite.).

Here, 3M has submitted evidence that a skilled artisan would understand that a microfiber web would not be “thermally stable” as recited in the claims of the ’375 Patent if there was not “uniform distribution” of an antioxidant or thermal stabilizer throughout the microfiber. Thus, to the extent that there is a “test” associated with “uniform distribution,” a skilled artisan would understand that it would be to evaluate the thermal stability at 135°C for 10 days. (This claim language is discussed more fully below.)

The Court concludes that a skilled artisan would understand the scope of the claims with reasonable certainty and, therefore, Defendants have failed to show that the term is indefinite by clear and convincing evidence.

3. “such that”

The parties dispute the meaning of the term “such that” as it appears in claims 1, 7-11, and 17 of the ’375 Patent: “said polypropylene microfibers formed of polypropylene homopolymers, copolymers or blends thereof with a nonvolatile thermal stabilizer or antioxidant is uniformly distributed throughout the microfibers such that the microfibers are thermally stable for at least 10 days at 135° C.” (’375 Patent at c.11, ll:43-48 (emphasis added).)

Defendants propose that the term be construed as “causing the result that.” In support of their argument, Defendants contend that the specification and prosecution history of the ’375 Patent demonstrate that “such that” should be understood to require a causal relationship. For example, the specification states that “[t]he thermal stability of the polypropylene melt-blown microfibers is *due to* use of a suitable nonvolatile stabilizer uniformly distributed throughout the microfibers of the polypropylene melt-blown web.”

(’375 Patent, c. 7, ll:43-46 (emphasis added).) Further, Defendants submit that during the patent’s prosecution, the phrase “such that” was added to claim 1 by an amendment, which the applicants stated was made to recite “that a sufficient level of nonvolatile antioxidant or thermal stabilizers are present in order to achieve the necessary thermal stability set forth in claim 1 as originally filed.” (Wright Decl.¶ 2, Ex. 17 at 3M 00003741.) Defendants submit that any construction of “such that” not requiring a causal relationship would effectively read out “such that” from the claim, and that a claim term should not be construed so as to read a limitation out of its meaning. *See, e.g., BBA Nonwovens Simpsonville, Inc. v. Superior Nonwovens, LLC*, 303 F.3d 1332, 1344 (Fed. Cir. 2002) (“Because [Defendant’s] construction reads a limitation out of the claims, we decline [Defendant’s] invitation.”).

3M believes that no construction is necessary and submits that Defendants have failed to indicate why construction is necessary or helpful. 3M does not, however, appear to dispute that the term “such that” requires a causal relationship.

The Court concludes that the intrinsic evidence of the ’375 Patent demonstrates that “such that” requires a causal relationship. The term is properly construed as “causing the result that.”

4. “the microfibers are thermally stable”

The parties dispute the meaning of “the microfibers are thermally stable” as it appears in claims 1, 7-11, and 17 of the ’375 Patent.

Defendants assert that this term is indefinite because it has no ordinary meaning and the intrinsic evidence fails to provide sufficient criteria for determining whether the

microfibers are “thermally stable.” Specifically, Defendants contend that the phrase “the microfibers are thermally stable” has no reasonably certain meaning to a skilled artisan; but rather, it is a term “generally used as short-hand for a material maintaining some specified quantity to some specified extent during some specified heat test.”

(Spiegelberg Decl. ¶ 65.) Defendants maintain that the phrase does not specify the quality to be maintained or the extent to which it is to be maintained. Defendants submit that the intrinsic evidence provides no guidance for determining whether a given microfiber web has, for example, “substantially maintained” its original color, original dimensions, or original suppleness. Instead, Defendants content that, without guidance, the determination of whether the microfibers are “thermally stable” is left to the subjective assessment of each skilled artisan as to “where the line is” on color, dimension, and suppleness, thus rendering the claim indefinite. Indeed, Defendants point to the testimony of 3M’s expert wherein he acknowledged that there is a “gray line” between passing and failing the test of thermal stability. (Wright Decl. ¶ 2, Ex. 41 (“Osswald Dep.”) at 105, 114, 128, 139.)

3M contends that the term need not be construed or, in the alternative, that it be construed to mean “the web samples substantially maintain their original color, dimensions, and suppleness.” Further, 3M submits that a skilled artisan would have been well-versed in the testing of polymer samples using oven age testing and determining whether the samples substantially maintained their original color, dimensions, and suppleness. (Osswald Decl. ¶¶103-04.) 3M also submits that a skilled artisan would have been able to make these determinations by visually inspecting the samples. (*Id.*)

The parties appear to agree that the term “thermally stable” generally refers to material maintaining some specified quality to some specified extent during some specified heat test. The ’375 Patent specification discusses Thermal Stability Evaluations:

The thermal stability of melt-blown microfiber webs was determined by placing test samples of the web in an oven maintained at 135° C. or 155°C. and monitoring the condition of the samples on a daily basis. Webs having no or low antioxidant levels would shrink, melt, embrittle and show discoloration with increasing time at the test temperature. Web thermal stability was reported as the number of days the web samples substantially maintained their original color, dimensions, and suppleness at the respective temperatures.

(’375 Patent at c. 8, ll: 57-67 (emphasis added).)

Here, the “thermally stable” term appears in the claim that relates to thermal testing—“the microfibers are thermally stable for at least 10 days at 135° C.” As discussed below, that testing involves placing samples of the microfiber web in an oven at 135°C for 10 days and then comparing the samples that came out of the oven with the original web samples. The specification speaks to the testing and what constitutes “thermal stability”—“[w]ebs having no or low antioxidant levels would shrink, melt, embrittle and show discoloration with increasing time at the test temperature. Web thermal stability was reported as the number of days the web samples substantially maintained their original color, dimensions, and suppleness at the respective temperatures.” (*Id.* (emphasis added).)

Defendants argue that the test for thermal stability requires a brighter line and that a skilled artisan cannot objectively measure whether a test material has “substantially

maintained” its original color, dimension, and suppleness. 3M disagrees and notes that this “before and after test” does not lend itself to precise numerical values because a skilled artisan is required to measure the change in color, dimension, and suppleness of various samples that will differ in color, dimension, and suppleness going into the oven. Thus, the patent contemplates that a skilled artisan will be required to analyze the comparison in light of the different samples going into the oven.

Patent claims that rely on a skilled artisan’s visual observation can be definite. *See, e.g., Proctor & Gamble Co. v. Team Techs., Inc.*, 46 F. Supp. 3d 764, 771 (S.D. Ohio 2014) (“Here, the term ‘almost/substantially unnoticeable to others when worn’ is an objective term that is well understood by those of ordinary skill in the art. Those skilled in the art know what ‘substantially/almost unnoticeable’ tooth whitening devices look like.”). This is because “artisans of ordinary skill are not mindless ‘automatons’” when measuring indefiniteness. *Source Search Techs. LLC v. Lending Tree, LLC*, 588 F.3d 1063, 1076 (Fed. Cir. 2009) (“Although at times difficult to determine the bounds of a ‘standard’ product or service, a person having ordinary skill in the art will possess an understanding of the system that will supply an objective definition to the various markets and applications of the system.”).⁹ In addition, patents commonly contain

⁹ The Court notes that Defendants’ experts relied on visual observation to determine thermal stability (Spiegelberg Decl. ¶ 90; Lickfield Decl. ¶ 51), and test methods cited by Defendants also use visual examinations. (Wright Decl. ¶ 2, Ex. 31 §§ 1.1, 10.3 (“Failure by this test method is visual evidence of localized discolorization or crumbling on any part of the specimen directly exposed to the air flow.”); *id.* ¶ 2, Ex. 32 §§ 1, 3 (“Accelerated ageing of test specimens by heat in the presence of air using a forced draught oven. Visual examination and determination of the time to failure.”)).

descriptive words that are used to avoid strict numerical boundaries to a specified matter, *see, e.g., Braintree Labs, Inc. v. Novel Labs, Inc.*, 749 F.3d 1349, 1359-60 (Fed. Cir. 2014), and words such as “substantially” are used to “accommodate the minor variations that may be appropriate to secure the invention.” *Verve*, 311 F.3d 1116, 1120 (Fed. Cir. 2002). 3M has submitted evidence that skilled artisans would be able to make the determination of whether test samples “substantially maintained their color, dimensions, and suppleness” upon visual inspection. (*See, e.g.,* Osswald Dep. at 104-06, 120; Wright Decl. ¶ 2, Ex. 44 (“Ebbens Dep.”) at 201-03.)

Here, the Court concludes that whether a test sample is “thermally stable” will depend on a comparison test (color, dimension, suppleness) used by skilled artisans who are able to detect any substantial change in color, dimension, or suppleness using oven age testing and visual examination. Thus, the Court further concludes that Defendants have not shown that the term is indefinite by clear and convincing evidence.

5. “for at least 10 days at 135° C”

a. Construction

The parties dispute the meaning of the term “for at least 10 days at 135° C” as it appears in claims 1, 7-11, and 17 of the ’375 Patent. The relevant claim language reads:

A thermally stable acoustical insulation microfiber web for attenuation of sounds waves comprising a melt-blown polypropylene microfiber web having an average effective fiber diameter of less than about 15 microns,

...

said polypropylene microfibers formed of polypropylene homopolymers, copolymers or blends thereof with a nonvolatile thermal stabilizer or

antioxidant in uniformly distributed throughout the microfibers such that the microfibers are thermally stable for at least 10 days at 135° C.

(’375 Patent at c. 11, ll:38-48 (emphasis added).)¹⁰

Defendants assert that this term should be construed as “the microfiber web is exposed to the flow of air in a forced air or convection oven by being placed on the rack, on an open, uncovered tray, or hanging in the oven for at least 10 days with the oven maintained at 135° C.” Defendants further submit that if the term is not so construed, then it is indefinite. 3M submits that the term, as written, is straightforward and requires no further construction. In addition, 3M submits that Defendants are attempting to import limitations into the otherwise clear claim language.

The Court begins with the claim language. Claim 1 recites a “thermally stable acoustical insulation microfiber web . . . such that the microfibers are thermally stable for at least 10 days at 135° C.” There is nothing in the claim language that speaks to a convection or forced air oven.

Next, the ’375 Patent specification states the following:

The polypropylene melt-blown microfibers of the acoustical insulation web are characterized by having substantial resistance to thermal degradation such that they are resistant to thermal degradation at a temperature of at least 135° C. for at least 10 days or at a temperature of at least 155° C. for at least 5 days . . . This reasonably corresponds to an accelerated version of an approximate thermal history for an average automobile lifetime

¹⁰ Claim 15 recites that “[t]he thermally stable acoustical insulation microfiber web . . . of claim 1 wherein the microfibers are thermally stable for at least 5 days at 155° C.” (’375 Patent at c. 12, ll:45-48.)

(’375 Patent at c. 7, ll:30-43.) Again, the specification makes no mention of a convection or a forced air oven.

Despite the lack of a reference to a convection or forced air oven, Defendants contend that a person of ordinary skill in the art would have understood the word “oven” in the specification to refer to one. (Dalton Decl. ¶ 2, Ex. 8, Supp. Spiegelberg Decl. ¶ 17; *id.* ¶ 2, Ex. 9, Supp. Lickfield Decl. ¶ 15.) Defendants submit that a person of ordinary skill in the art would have understood that “placing the test sample of the web in an oven” means that the web is exposed to the flow of air by being placed on the rack, on an open, uncovered tray, or hanging in the oven. (Supp. Spiegelberg Decl. ¶¶ 18-19; Supp. Lickfield Decl. ¶ 15.) Defendants contend that by so placing the sample, each sample would experience the same temperature and air flow. (*Id.*) Defendants maintain that exposing the test samples to air flow is appropriate because the materials being tested are exposed to air in the field of use and that restricting the samples’ exposure to air flow would affect a primary driver of degradation. (*Id.*) Defendants also contend that the inventors themselves placed their samples, when testing, on an uncovered aluminum tray and that this practice is confirmed by prior art references relating to accelerated heat age testing of polypropylene products.

3M has submitted evidence that a skilled artisan can test thermal stability of the microfiber web by applying elevated temperatures to a sample *or* by blowing heated air on the sample. The claim language of the ’375 Patent, however, clearly suggests to a skilled artisan that the appropriate test would use temperature to gauge thermal stability—“135°C for at least 10 days”—because the claim language expressly recites a

time and temperature at which the microfibers must remain stable, but does not mention airflow or the use of convection ovens.

Defendants acknowledge that temperature and oxygen exposure are two primary factors in the thermal degradation of polypropylene. (Supp. Spiegelberg Decl. ¶ 17; Supp. Lickfield Decl. ¶ 15.) Defendants contend, however, that the claim should include a limitation that requires test exposure to the air flow based on the contention that the materials tested would be exposed to air flow in the field of use. This argument is unpersuasive. The claims of the '375 Patent are directed to microfiber webs used as insulation. Insulation is typically used inside of objects, and in fact, Figure 3 of the '375 Patent depicts the use of the thermally stable web positioned on an inner panel of a vehicle door. The use of the patented insulation in closed spaces underscores that the thermal stability of the insulation is appropriately tested using temperature, not airflow. Finally, Defendants do not point to any specific reference of using a forced air oven in the prosecution history.

Based on the above, the Court concludes that a skilled artisan would understand the term “for at least 10 days at 135°C” to require that the microfibers of the acoustical insulation be thermally stable for at least 10 days at 135°C. The Court further concludes the intrinsic evidence clearly supports the use of temperature to test the thermal stability of the insulation and that a skilled artisan would understand that when testing thermal stability, all variables other than time or temperature must be adequately controlled. Defendants’ proposed construction would improperly add limitations into the claims that

are not supported by the intrinsic evidence. The Court therefore concludes, based on the intrinsic evidence, that the term does not require further construction.

b. Indefiniteness

Defendants argue that, to the extent this claim's construction is understood to encompass both a method in which the microfiber web is enclosed so that the effect of air flow is minimized *and* a method in which the microfiber web is exposed to the flow of air in a forced air or convection oven, the claim is indefinite. Defendants assert that the use of these two methods would produce different, outcome-determinative results. In particular, Defendants note that after 3M filed this action, 3M and Defendants performed or commissioned accelerated heat age testing on Defendants' accused product.

Defendants assert that 3M used the "dome" testing method, while Defendants tested the samples by placing them directly on the rack of a convection oven (the "enclosed" method). The results of the tests were different, and Defendants maintain that the different results render the claim indefinite. Defendants further maintain that even under its own proposed construction (requiring exposure to air flow in a forced air or convection oven), the term may be indefinite because the intrinsic evidence fails to specify additional aspects of the test method (such as the flow rate of the oven, acceptable temperature ranges, and size and shape of samples) that could impact the heat resistance of the microfiber webs.

3M asserts that the term is not indefinite and that a skilled artisan would understand that all variables, other than time and temperature, should be adequately controlled during testing so as not to render the results unreliable. (Osswald Decl.

¶¶ 121-28.) To do so, 3M submits that a skilled artisan would understand that such a test could be conducted by placing a sample in an oven at 135°C for 10 days, and by also minimizing the effect of air flow. (*Id.* ¶¶ 121, 123, 126, 136.) 3M asserts that one way to perform such a test can be found in 3M’s Standard Operating Procedures, which teaches one to place samples on an aluminum tray and to place another tray on top (the “dome” test) so that the effect of air flow is minimized. (*Id.* ¶ 128; Wright Decl. ¶ 2, Exs. 41-43.)¹¹

First, the Court has declined to adopt Defendants’ proposed construction, and instead has determined that the plain and ordinary meaning of the time and temperature term simply requires that the microfibers of the acoustical insulation be thermally stable for at least 10 days at 135°C, and that when testing thermal stability, all variables other than time or temperature must be adequately controlled. Because all other variables must be controlled, air flow must also be controlled. (Osswald Decl. ¶¶ 121-28.) Therefore, the “enclosed” method would not be a valid test according to the terms of the ’375 Patent and the fact that the “enclosed” method could yield different results does not render the term indefinite.

Second, Defendants point to the results of Exova Testing Report to demonstrate that the “dome” tray test and “single” tray test will yield different results. However, as

¹¹ Defendants assert that 3M has changed its testing methods from a single tray to domed trays to conduct thermal stability testing between 2011 and 2012. However, 3M submits evidence that 3M has used “domed” trays for thermal testing since at least 2010, and used them for the 2011 and 2012 testing on which Defendants rely. (*See generally* Doc. No. 91, Mackey Decl.)

discussed above, the issues raised surrounding the testing of the samples do not demonstrate that the term is indefinite. Rather, the issues related to the testing of the samples are issues of infringement. *See ADC Telecomms., Inc. v. Switchcraft, Inc.*, 281 Fed. Appx. 989, 992 (Fed. Cir. 2008); *Union Carbide*, 425 F.3d at 1377; *Takeda Pharma.*, 743 F.3d at 1366-67.¹²

Based on the finding above with respect to the construction of the time and temperatures limitation—that skilled artisans would understand that when testing thermal stability according to the patent, all variables other than the specified time and temperature (10 days at 135°C) should be adequately controlled so as not to render the results unreliable—the Court also concludes that Defendants have not demonstrated that the term is indefinite by clear and convincing evidence. Instead, a skilled artisan would understand that such a test could be conducted by placing a sample in an oven at 135°C for 10 days, and by also minimizing the effect of air flow.

¹² Defendants rely on *Honeywell Int'l, Inc. v. ITC*, 341 F.3d 1332, 1340-41 (Fed. Cir. 2003). Defendants submit that *Honeywell* stands for the proposition that a claim term directed to a measured property is indefinite where two or more methods of measuring the property are known, but the intrinsic evidence does not specify the method to be used, and the outcome of the measurement will depend on the selected method. In *Honeywell*, there were four known and accepted methods of gathering and preparing material (yarn) for measuring a feature of the yarn (its melting point elevation). *Id.* at 1336-37, 1339-40. It was also established that the four methods produced significantly different results. *Id.* at 1337. In *Honeywell*, the Federal Circuit determined that the disputed claim was indefinite. *Id.* at 1340. Here, however, there is no dispute as to how to prepare the samples for testing, but there is a dispute as to whether the test methods put forth by Defendants are appropriate for testing thermal stability as claimed in the patent. Therefore, this case is distinguishable from *Honeywell*, and more closely aligned with the numerous cases wherein the disputes involving test methods were part of the infringement analysis.

6. “adapted to be secured to an article”

The parties dispute the meaning of the term “adapted to be secured to an article” as it appears in claim 17 of the ’375 Patent. Claim 17 reads, in part: “The thermally stable acoustical insulation web for attenuation of sound waves of claim 1 provided as a panel adapted to be secured to an article.” (’375 Patent at c. 12; ll:52-54 (emphasis added).) Defendants assert that the term is indefinite. In particular, Defendants assert that the phrase describes the claimed acoustical insulation web in functional terms, but that the scope of the term is ambiguous. Defendants argue that a person of ordinary skill would require guidance to distinguish acoustical insulation webs that are “adapted to be secured to an article” and those that are not. (Lickfield Decl. ¶ 56.) Defendants further submit that the intrinsic evidence offers no such guidance.

3M asserts that the term “adapted to be secured to an article” is straightforward and well-supported by the specification. 3M further asserts that a skilled artisan would understand that the term refers to a part or section of acoustical insulation web that has dimensions that permit it to be secured to an article (such as a car door) and, if necessary, has sections removed that conform with certain interior dimensions of the article. (Osswald Decl. ¶¶ 141-43.)

Figures 1-3 of the ’375 Patent depict what it means for a panel of web to be “adapted to be secured” to an article. (’375 Patent at c. 6, ll:66-c. 7, ll:29, FIGS. 1-3.)

Referring to FIG. 1, in the embodiment illustrated, the acoustical insulation laminate **10** [the panel] includes side edges **18** and **20** bottom edge **25** and top edge **33**. To allow the laminate **10** to be attached to the surface to be protected, the film **14** of the laminate **10** can have adhesive **40** applied to selected areas thereof after the laminate **10** is thermoformed as

described above. If desired, the surface of the, e.g., film **14** to which the adhesive is to be applied can be treated prior to applying the adhesive to modify the surface characteristics of the film surface for enhancing bonding of the adhesive to the film **14**. . . .

. . .

Typically, the panels are spaced to provide an internal channel for accommodating various internal window operating mechanisms and the like. For this reason, the inner panel **70** is generally formed with an uneven shape or contour for accommodating and mounting various accessories or the like, for example, in FIG. 2 a speaker opening **80** is formed through the recessed area **72** of the inner panel **70** centrally of the generally cylindrical portion **78**. FIG. 3 illustrates the laminate **10** in its installed position on the door **12**.

(’375 Patent at c. 6, ll:66-c. 7, ll:29, FIGS. 1-3.) The figures show the “panel” (or “laminate **10**”) has exterior dimensions to fit inside a car door having an inner panel with an “uneven shape or contour” where the web panel also has a section removed to conform to the circular opening for the speaker. (*See id.*)

Based on the above, the Court concludes that a skilled artisan would understand that the term “adapted to be secured” refers to a part or section of acoustical insulation web that has dimensions that permit it to be secured to an article and, if necessary, has sections removed to conform with certain interior dimensions of the article. Thus, the term is definite. *See Power-One v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1348 (Fed. Cir. 2010) (“The term[] ‘adapted to’ . . . [is] not facially vague or subjective” where “a person of ordinary skill in the field would understand the meaning of . . . ‘adapted to’ because the environment dictates the necessary preciseness of the terms.”).

ORDER

Therefore, **IT IS HEREBY ORDERED** that:

1. The claims at issue are construed as set forth in this Memorandum Opinion and Order.

2. 3M's Motion to Exclude (Doc. No. [96]) is **DENIED AS MOOT**.

Dated: May 19, 2015

s/Donovan W. Frank
DONOVAN W. FRANK
United States District Judge